

## Answer All Questions

*Note: A total of 10 marks, made up of 2 marks for each of the following, will be awarded: legibility, language, presentation, logical reasoning, and professional touch.*

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### Question 1

The Tarkus Mining Company (TMC) has made the following arrangements to raise a total capital of \$50 million to undertake a mining project:

- \$10 million is to be raised by issuing hundred thousand preferred stock shares costing \$100 per share with a promise to pay \$20 dividend per share every year.
  - \$20 million is to be raised as a loan from a bank at a yearly interest rate of 10% compounded quarterly.
  - \$20 million is to be raised by selling twenty thousand bonds at \$1000 per bond. Each bond will mature in 10 years with a maturity value of \$1200 and also earn a dividend of \$100 per year.
- (i) What is TMC's cost of the total capital?
- (ii) What is the significance of the cost of capital in the economic evaluation of the mining project?

### Question 2

TMC is considering replacing an equipment at one of its mines. Purchasing and installation of the new equipment will cost \$ 15 000. It will have an estimated service life of 8 years and \$ 3 000 salvage value. The operating cost will average \$ 100/yr. The present equipment is expected to have 8 more years of service life, at the end of which it can be sold for \$2 000; its operating cost is \$ 1 800/yr. If the present equipment is replaced now, it can be sold for \$5 000.

If the minimum rate of return is 15%, should TMC replace the present equipment?

### Question 3

De Ro Mining Company (DRMC) is evaluating the economics of whether to purchase a mineral property now (year zero) for \$10 M with plans to spend a significant amount of capital in the next year (year 1) for development. Production is expected to start in year 2 with an annual profit of \$2 M per year up to the end of year 15 when the project will be terminated with zero salvage value. What capital cost can be incurred in year 1 for the project to break even if the minimum rate of return is 20%.

### Question 4

*Read the information provided here and answer the questions that follow.*

Located near Winneba in the Central Region of Ghana, the Mike Rock Quarry (MRQ) has over 10.00 million cubic metres of granite reserves. The setting up of MRQ took 2 years and it has operated for the past 3 years. Because of the high quality of its quarry products, MRQ had been enjoying the patronage of numerous clients. Recently, however, MRQ has been facing operational problems due to lack of spare parts to repair and maintain its equipment and lack of working capital to operate smoothly. The current situation is that MRQ is unable to produce the minimum of 30 000 m<sup>3</sup> of granite aggregate per month to meet the demand of its clients; production has gone down significantly, making it impossible for MRQ to meet its statutory financial obligations. If MRQ could repair its equipment, purchase additional new equipment, pay for outstanding statutory financial obligations and secure sufficient working capital, it could conveniently produce the required 30 000 m<sup>3</sup> of granite aggregate per month.

To arrest the situation, the Board of Directors (BoD) of MRQ has requested for a comprehensive evaluation of the quarry with the following Terms of Reference (ToR):

- (i) Estimate the initial capital spent on acquisition of the granite concession, exploration and compensation and the current value of existing equipment;
- (ii) Estimate the direct capital required to purchase spare parts and accessories to repair existing equipment and also purchase additional new equipment so that the quarry can conveniently produce 30 000 m<sup>3</sup> of aggregate per month;
- (iii) Estimate the indirect capital required to pay for outstanding statutory financial obligations;
- (iv) Estimate the working capital required to enable MRQ to operate smoothly;
- (v) Estimate the yearly operating cost when the production is 30 000 m<sup>3</sup> per month.
- (vi) Estimate the expected yearly revenues;
- (vii) Conduct a cash flow analysis for the next 10 years taking into account all statutory provisions in the investment laws of Ghana;
- (viii) Investigate the sensitivity of the quarry to changes in revenue, capital cost and operating cost and conduct risk analysis;
- (ix) Advise the BoD on the merits of the MRQ.

The BoD has made it clear that, depending on the outcome of the evaluation, they would ask the shareholders to go for one of the following options:

- (i) Call for additional equity contributions by the 3 shareholders of MRQ to purchase the additional new equipment, pay for outstanding statutory financial obligations and provide for a working capital and so operate the quarry with 100% equity;
- (ii) Secure a loan to purchase the additional new equipment, pay for outstanding

statutory financial obligations and provide for a working capital and so operate the quarry partly with equity and partly with loan; or

(iii) Stop operating the quarry and sell it out at least to pay for outstanding statutory financial obligations and defray the initial capital.

The shareholders have cautioned that they cannot secure any loan that will attract an interest less than 10% and that they would expect at least 13.5% return on their investment.

Upon request, the Management Team of MRQ has provided some information that could be useful in the evaluation of the quarry. This information is presented in Tables 1, 2, & 3. In addition, the Management Team has confirmed that the average selling price of the quarry products is \$ 15/m<sup>3</sup>.

Answer the following questions:

- (a) Making use of the available information plus other realistic costs that you can obtain by research and taking into account the ToR of the BoD of MRQ, conduct a comprehensive evaluation of the quarry and hence advise the BoD.
- (b) Apart from the 3 options stated by the BoD, state any other option the BoD could consider, giving the justification for such option.
- (c) At the given production rate, what is the expected life of the quarry?
- (d) Suggest any reason why the BoD wants 10 years to be considered for the evaluation of the quarry.

Table 1 Information on MRQ's Existing Equipment

No.	Equipment	Fleet ID	Purchase Price	Rated Usefulness Life	Spent Life
1	Atlas Copco 3D Rock Drill	MRQ RD 1	197 600	20 000 hr	3 000 hr
2	CAT 330 DL Excavator	MRQ E1	325 000	30 000hr	11 500 hr
3	CAT 325 CLN Excavator	MRQ E2	156 000	30 000 hr	9 000 hr
4	CAT 966 H Wheel Loader	MRQ WL1	260 000	30 000 hr	2 000 hr
5	Metso LT110c Mobile Secondary Cone Crusher	MRQ C1	888 000	30 000 hr	9 062 hr
6	Metso LT 300 GPB Mobile Secondary Cone Crusher	MRQ C2	1 360 000	30 000 hr	8 200 hr
7	Metso ST 458 Mobile Screen	MRQ C3	328 000	30 000 hr	8 000 hr
8	SD M0 40 KV Generator	MRQ GE2	7 800	20 000 hr	10 000 hr
9	SD M0 30 KV Generator	MRQ GE2	6 500	20 000 hr	10 000 hr
10	Mosa Welding Set	MRQ WG1	5 000	20 000 hr	5 000 hr
11	Toyota Hilux Pick-up	MRQ LV1	35 000	250 000 km	30 000 km
12	Toyota Hilux Pick-up	MRQ LV2*	12 500	200 000 km	70 000 km
13	Toyota Hilux Pick-up	MRQ LV3*	7 500	150 000 km	80 000 km
14	Hyundai Mini Bus	MRQ MB 1*	7 500	200 000 km	80 000 km
15	Quad Bike	MRQ B1	7 000	180 000 km	80 000 km
16	Quad Bike	MRQ B2	7 000	180 000 km	80 000 km
17	Hydraulic Hammer	MRQ HH1	39 000	30 000 hr	18 000 hr
18	Grizzly	MRQ GRS1	5 600	20 000 hr	0 hr
19	Atlas Copco X36 Compressor	MRQ CP1	6 400	30 000 hr	1 500 hr

Table 2 Capital Items of MRQ

Category Code	Cost Centre	Amount (US\$ $\times 10^3$ )
C 1	Initial Capital	
C 1.1	Acquisition, Exploration, Compensation	100.00
C 1.2	Existing Equipment	
C 1.3	Site Infrastructure and Facilities	150.00
	Subtotal C 1	
C 2	Direct Capital for Additional New Equipment	
C 2.1	SEM Wheel Loader	
C 2.2	VSI Impactor	
C 2.3	Tamrock Drill Rig	
C 2.4	Toyota Bus	
C 2.5	Toyota Pick-up x3	
C 2.6	CAT 100 KVA Genset	
C 2.7	CAT 40 KVA Genset	
C 2.8	Spares and Accessories	300.00
	Subtotal C 2	
C 3	Indirect Capital for Outstanding Statutory Obligations	
C 3.1	Compensations	50.00
C 3.2	Legal Issues and CSR	200.00
C 3.3	Explosive Magazine	10.00
C 4	Working Capital	230.00
C 5	Contingency Allowance	226.72
	Total Capital Cost	

Note: Legal issues include outstanding bills in respect of royalty, ground rent, taxes, licenses and permits.

Table 3 Unit Operating Costs of MRQ

Cost Centre	Unit Cost (\$/m <sup>3</sup> )
Overburden Removal	0.50
Drilling	0.30
Blasting	1.00
Crushing and Screening	1.00
Fuel	1.20
Equipment Hiring	0.20
Salaries	1.50
Overheads	0.30
Administration	0.30